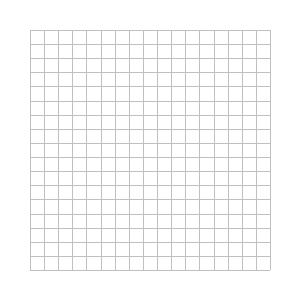
C:\Documents and Settings\marianne.lecesne\Local Settings\Temporary Internet Files\Content.IE5\6058TNUS\MC900155042[1].wmf1. Farmer Dell has 150 feet of fencing to put around a rectangular pig pen. If a 10 foot opening is left on one side for a special order gate, find the dimensions to give Farmer Dell’s pigs the maximum area in which to play in the mud.

Draw a diagram: Equation:

Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C:\Documents and Settings\marianne.lecesne\Local Settings\Temporary Internet Files\Content.IE5\ENR6J9IR\MC900012969[1].wmf

2. When the **SheSellsSeaShells Candy Store** charges $4 per package of salt water taffy, the average number of packages sold is 300 per week. For each 20 decrease in price, the average sales goes up by an average of 35 packages per week. What price should, in theory, maximum their profit?

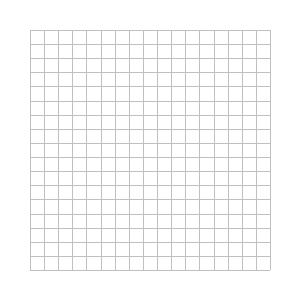
Equation:

Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C:\Documents and Settings\marianne.lecesne\Local Settings\Temporary Internet Files\Content.IE5\ENR6J9IR\MC900233188[1].wmf3. And now, back at the ranch…. Farmer Dell also sells cattle. The average weight of each animal is presently 1000 lbs, and is increasing by an average of 7 lb per day. Even without a degree in rocket science, Farmer Dell seems to think that he should wait to sell his cattle; however, it IS high-cattle season right now. Current prices are averaging $0.57 per pound and are expected to drop by about $0.003 per day for the next 2 months.

a)Write an equation to model his dilemma.

b) Would Farmer Dell make more or less $ by waiting to sell in 10 days? What is the price difference?

c) When, in the next 30 days, should he sell in order to maximize his profit per animal?

d) If he owns 400 head of cattle, how much more would he make by selling at the maximum price than by selling immediately?

4. While Luke and Leia are out cruising the galaxy, they get distracted by an argument between R2D2 and C3PO and their attention strays from their ship’s pathway. When R2D2 gets angry and glides off, Luke turns his attention back to navigating the ship and receives quite a shock! Directly ahead of them is an enemy “planet!” Luke immediately fires the retro-rockets and the spaceship begins slowing. If all goes well, the ship will stop for an instant and the begin pulling away from the planet. Leia runs back to help and begins marking their times and distance from the planet. At times *t=*1, 2, and 3 minutes, their distances, *d,* from the planet are 425, 356 and 293km, respectively.

a) Leia quickly finds a mathematical model to represent their situation. What is it?

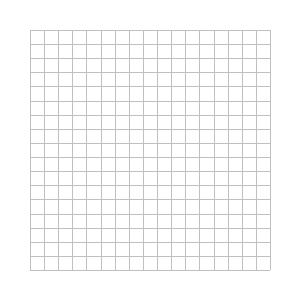
b) What is the *d-*intercept?\_\_\_\_\_ and what does it mean to Leia?

c) According to her calculations, where will their ship be relative to the planet 15 minutes after firing the rocket?\_\_\_\_\_\_\_ At *t=*16?\_\_\_\_\_ At this time, is the ship still headed towards the planet?\_\_\_\_\_\_\_

d) At how many minutes will the ship begin to pull away from the planet? \_\_\_\_\_\_\_\_\_\_\_\_

e) Do they make it away from the planet, just reach the planet before leaving or do they crash into the planet? And how do you know?

[](http://www.google.com/imgres?q=luke+and+leia&hl=en&sa=X&qscrl=1&nord=1&rlz=1T4TSHB_enUS372US372&biw=778&bih=414&tbm=isch&prmd=imvns&tbnid=kvVzeSlMglhLmM:&imgrefurl=http://www.fanpop.com/spots/luke-and-leia/images/23946588/title/luke-leia&docid=IRDNYErO78JIfM&imgurl=http://images4.fanpop.com/image/photos/23900000/Luke-and-Leia-luke-and-leia-23946588-360-353.jpg&w=360&h=353&ei=HlEHT9zuFYLYtweI2OSPAw&zoom=1&iact=rc&dur=2828&sig=108062998845199252391&page=9&tbnh=81&tbnw=78&start=94&ndsp=12&ved=1t:429,r:10,s:94&tx=62&ty=59)5. Luke and Leia are captured by their enemies of the Galactic Empire and are isolated in a closed room. The room measures 20 x 15 meters. Suddenly, Leia shrieks as she realized that the walls are starting to move in. Luke contacts R2D2 for help and tells him that the length of the room is decreasing at a rate of 2 m per minute while the width is increasing at a rate of 3 m per minute. He, of course, wants to know how much time he and Leia have to find a way out. You, unfortunately, don’t have access to R2D2, and so you will have to find this out for yourself.

a) Let L(t) and W(t) be the length and width of the room, respectively, in meters. Let t = the number of seconds since the walls starting moving. Write the particular equations for L(t) and W(t).

b) Let A(t) = the number of square meters of floor space in the room. Find an equation for A(t)

c) Does the area of the room reach a maximum? If so, when? If not, how can you tell?

d) When will the area of the room = 0?

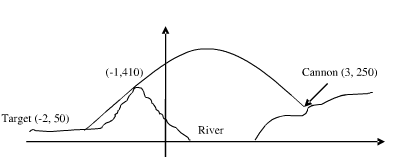
e) Graph the Area of the room with respect to time over a reasonable domain.

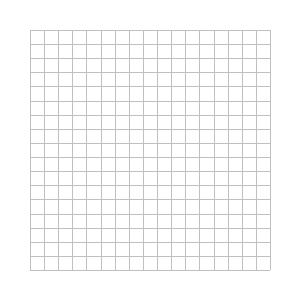
6. Well, against all odds, Luke and Leia escape from their shrinking tomb. They flee the area, crossing a river and mountain, waiting for a rescue fighter. Their position is shown below. Meanwhile, Stormtroopers on the other side of the river are firing at them from the position shown. (No, they can’t just march across the river, because their electrical equipment is not waterproof.) The Stormtroopers plot their position, the position of their target and the position of the top of the mountain, in order to ensure that they enter the correct equation for the path of their weapon of destruction.

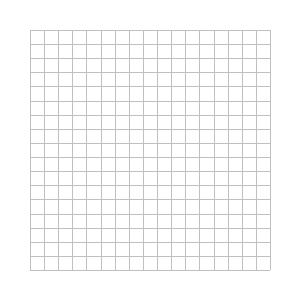
a) Assuming that the projectile will follow a parabolic path, find the particular equation that they should use.

b) The X-Wing Fighter is flying at 660m above the river. Is it in danger of being hit by the projectiles fired by the Stormtroopers ?



[](http://images.wikia.com/starwars/images/0/0d/Storm-CHRON.jpg)

C:\Documents and Settings\marianne.lecesne\Local Settings\Temporary Internet Files\Content.IE5\0FS5QRXC\MC900295732[1].wmf7. After having to drain the College Park Community Pool (you remember that disaster??), the Parks Dept. decides to jazz up the design of the pool, by painting a border all around the outer edge of the bottom of the pool. The artists hired tell the Parks Dept. that the most aesthetically pleasing pool border designs are those whose area is ½ of the bottom of the pool. If the border is of equal width all the way around the bottom of the pool and the dimensions of the bottom of the pool are 120m by 180 m, how wide should the border be?



C:\Documents and Settings\marianne.lecesne\Local Settings\Temporary Internet Files\Content.IE5\0FS5QRXC\MC900231951[1].wmf8. Since the pool is closed for remodeling and cleaning, the Parks Dept. decides to add a walkway all away around the pool. If the walkway is of equal width all the way around the pool and they have enough decorative bricks for an area of 1063 sq. meters, how wide should the walkway be?

[](http://en.wikipedia.org/wiki/File:St_Louis_night_expblend_cropped.jpg)9. On a trip to St. Louis you visit the Gateway Arch. A plague on one end says that the 2 ends of the arch are 162 m apart. Unfortunately, the plague is so weathered that you cannot read the height. If you walk 1 meter towards the other end of the arch, the height at that point is 4.55 m. Since the arch appears to be quadratic, you decide that you have enough information to estimate its height.

a) Find an equation to model the underside of the arch.

b) What is the height?

c) An airplane with a wing span of 40 meters wants to fly through the arch. If the altitude of the plane was 170m, would the airplane make it? Justify your answer.

d) What is the highest altitude that would allow the plane to pass through the arch?

10. A wall painting is 11’ x 14’. Tiles are to be glued to the wall around it to make a frame. It the total area the tiles can cover is 150’, what should the width of the frame be if it is to be the same width all around the painting?

11. A painting is 5 inches longer than it is wide. If a 2” border is added to all sides, then the total area will be 414sq”. What are the dimensions of the painting itself?

12. The outer dimensions of a framed portrait are 25” x 40”. If the area of the frame is 504sq”, what is the width of the frame?

13. Suppose the outer dimensions of the framed portrait are 20” x 12”. If the portrait itself has an area of 84sq”, what is the width of the frame?

14. A piece of cardboard is twice as long as it is wide. It is to be made into a box with an open top by cutting 3 cm squares from each corner and the folding up the sides. If the volume of the box is 3300cm2, what are the original dimensions of the cardboard?

15. The square of the sum of 2 consecutive integers is 529. What are the numbers?